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ENVIRONMENT VIEWS



*Lifelines:
Alberta's Rivers*

environment
week '92



ENVIRONMENT VIEWS

Cover: The trout have returned to the North Raven River (see story page 21). Photo by K.T. Crutchfield.
Below: Elk crossing the Athabasca River in Jasper National Park.

3 Editor's Notebook

4 Around the Province

5 Living Flow

Celebrating the life of the river.

10 Life Lines

9,000 years of human history along the rivers.

12 What Do You Know?

A special rivers quiz for Environment Week '92.

17 Problems with the Plumbing

Do we have the right to treat our rivers as utilities?

22 Letters

24 Environment Update



KEVIN VAN TIGHEN

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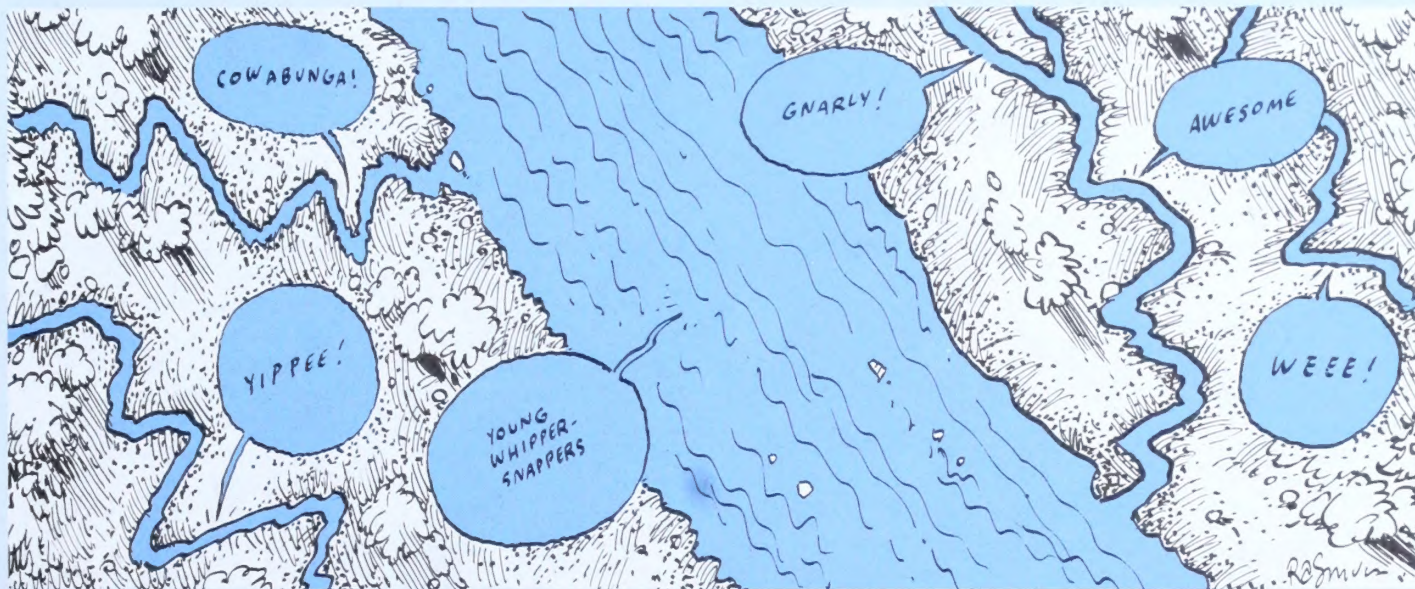
The editorial board was helped in preparing this issue by Stewart Rood, chair of Biological Sciences, University of Lethbridge, John Lilley, research director, Alberta Water Resources Commission, and Kevin Van Tighem, an interpretive specialist with Parks Canada and organizer of the Flowing to the Future conferences.

Alberta
ENVIRONMENT



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A Look at the Living River



By the time it came to the edge of the forest the stream had grown up, so that it was almost a river, and, being grown up, it did not run and jump and sparkle along as it used to do when it was younger, but moved more slowly. For it knew now where it was going, and it said to itself, "There is no hurry. We shall get there some day." But all the little streams higher up in the forest went this way and that, quickly, eagerly, having so much to find out before it was too late.

— E.E. Milne, "In Which Pooh Invents a New Game and Eeyore Joins In," *The House at Pooh Corner*.

When Stewart Rood, biology prof and impassioned river buff, told the planning meeting for this issue that he liked the metaphor of a human life – from tumultuous youth

to serene old age – for the mountains-to-the-plaintains profile of a river, this quote came to mind, but I couldn't quite place it.

I went first to Kenneth Grahame's "The Wind in the Willows," which (with a few digressions for the misadventures of Mr. Toad) is basically a celebration of river life. Alert readers will note the uncredited reference to "messing about in boats" in Eric Bailey's article on the joys of river life. Remember when an amazed Mole asked his new friend the Water Rat about river life?

"And you really live by the river? What a jolly life!"

"By it and with it and on it and in it," said the Rat. "It's brother and sister to me, and aunts, and company, and food and drink, and (naturally) washing. It's my world, and I don't want any other. What it hasn't got is not worth having, and what it doesn't know is not worth knowing. Lord! the

times we've had together!"

I wasn't surprised, either, to find Eric Bailey could not resist studding the main story with his favorite quotations about rivers and river life, from Heraclitus to naturalist Roderick Haig-Brown. There is something about a river....

But these are the nineties, and this is Alberta, and there has to be more to environment views about rivers than celebration. Writer Gail Helgason looks at the importance of rivers to our past, noting that Alberta riverbanks supported communities as long as 8,000 years ago, and that the Clearwater and other major rivers played a vital role in the European exploration and settlement of the province. And finally, Lynn Zwicky talks to a number of environmental riverwatchers about the impact of that European settlement on our rivers. We have been taking too much water out and putting too much waste in.

There are some hopeful signs: talks with B.C. authorities about reducing the impact of the Bennett Dam on the Peace-Athabasca delta, and a steady improvement in municipal sewage treatment, for example. Back to the recurrent theme of this issue, the metaphor of rivers as living things. What we must decide – and sooner rather than later – is how much we can dam and straighten and pollute our rivers before we choke the life out of them.

We hope you enjoy this special Environment Week issue of *Environment Views*. Don't forget to try the quiz – you may find out something surprising about hundred-year floods and big fish, among other things.

Maryhelen Vicars, the editor of *Environment Views*, is a professional writer based in Edmonton.

Re-Tiring in New Ways

Alberta's bean capital is coming up roses in an environmentally friendly way. Flower planters shaped like bean pots and made from discarded tractor tires are showing up all over the town of Bow Island.

It started last year after Fred Mellen, the town's economic development officer, saw some turned-out tractor tires being used as cattle feeders.

"I thought, 'Hey, they look like bean pots,'" Mellen says.

The farmer had the equipment to turn the tires. Mellen asked for three, took them home, painted them brown and added handles to complete the effect. Some soil, flowers and presto – an eco-planter that "just looked fantastic, and people liked."

He loaded them into his truck – not an easy task ("There's a lot of dirt in those suckers") and hauled them to new homes in front of local businesses.

The farmer turned 24 more tires. Half had been spoken for as of early spring for local business locations.

There's no cost. "We're just asking people to fill them and plant them."

The bean pot planters will be around for awhile. They're weatherproof and vandal-proof.

"You could hit them with a vehicle, and it wouldn't hurt them," Mellen says.

"Nobody could ever steal them, because they're too heavy."

The planters are good fun, but they are just the latest recycled tire product to hit the town of 1,500 plus, 325

kilometres south of Calgary. Eldon Conquergood set up EC Recycling Tire Mats three years ago.

He went through 8,000 old car, truck and implement tires in 1991. The woven rubber mats turn up in front of doors – Environment Minister Ralph Klein has one in front of his office door – on the bottom of



pickup truck boxes and the floors of horse trailers.

They make great fatigue mats for "any place where people are standing," Conquergood says. Banks, stores, machine shops have bought them.

He's added a duck flower planter, a child's horse swing and a bird feeder to his product line. He markets his wares at trade shows and finds the word "recycled" in his display brings in the customers.

Business, Activists Reducing Together

Call it different players getting together to tackle the problem of reducing waste.

That's what happened recently at the Alberta Waste Minimization Congress. The day-long event at the

Edmonton Convention Centre drew about 200 people from across Alberta.

"Everyone says environmental groups like to slam business," says Lorraine Swift of the Environmental Resource Centre, hosts of the congress, "But here we tried to get everybody together and work toward some solutions."

It was the first such gathering held in Alberta. The idea was to bring the stakeholders to one location to trade information.

A second aim was to provide economical, action-oriented strategies to motivate businesses to conserve resources and reduce waste through reduction, reuse, recycling and proper treatment.

Swift says participants at the six workshops joined in and traded experiences and solutions. The workshops covered food and beverage service, construction/demolition, retail, manufacturing, office and automotive.

"We were all united in our cause. We all believed in it."

The City of Edmonton Public Works Department partially sponsored the congress.

Contacts and feedback from the congress now are helping the Environmental Resource Centre put together a set of workplace waste minimization manuals, Swift says.

Money on the Table at Globe '92

Remember "Make the polluter pay?" The old slogan was revisited at the recent Globe '92 conference in Vancouver, as delegates

discussed new systems of taxes and charges to pay for environmental costs.

"Fee-bates" – a system of rebates and fees for buyers of energy-efficient or energy-gobbling equipment – should also be considered, Janine Ferretti of Pollution Probe told the gathering.

Other recommendations from the conference's organizers included finding new ways to price air and water. Having corporations identify their environmental assets and liabilities in regular reports was another recommendation.

About 3,000 people attended Globe '92. The conference cost \$6 million and was subsidized by \$1.5



million in federal money.

Delegates heard of environmental problems around the world and possible solutions. Norwegian environmentalist Jan-Olaf Willums said governments should establish environmental goals and let business find out how to meet them.

This was a recurring theme of the five-day conference.

But a group of 20 environmental organizations attacked the conference for its style – calling it a high-rolling, taxpayer-funded junket that ignored minorities – and its lack of specific recommendations.

Globe '92 recommendations have been sent to Brazil, to the United Nations Conference on Environment and Development to be held in June in Rio de Janeiro.

Eric Bailey

LIVING FLOW

Celebrating Alberta's Rivers



HUGH LECKY

Whitewater paddlers find their place in the early life of the river, as it comes rushing down from the mountains. Bob Smith (right) and David Ford in C2 competition.

Of all of Canada's provinces and territories, only Alberta and Saskatchewan stand high and dry, isolated from an ocean. Cut off from the sea, we people of the western plains seek inland coastlines.

We have invested the names of our rivers with magic – the mere mention of the mighty Peace, the North Saskatchewan, the Red Deer, the Bow or the Oldman, has the power to trigger an inward journey among men and women who have nourished and tried their bodies, their minds and their spirits on these waters. The names invoke images of mountain cascades,

whitewater, killer floods, clear pools and the big olive carpets that slide noiselessly out of the province – our gift to parched prairie neighbors.

Shaping the Land

Alberta owes much of its shape to rivers present and past. Before the rise of the Rocky Mountains, rivers from the east brought sediments to this land that can be seen in some of the uplifted layers of the Rockies. Once the western mountains began to rise, new rivers cut channels into the rock and carried the sediment onto the plains that would one day become Alberta.

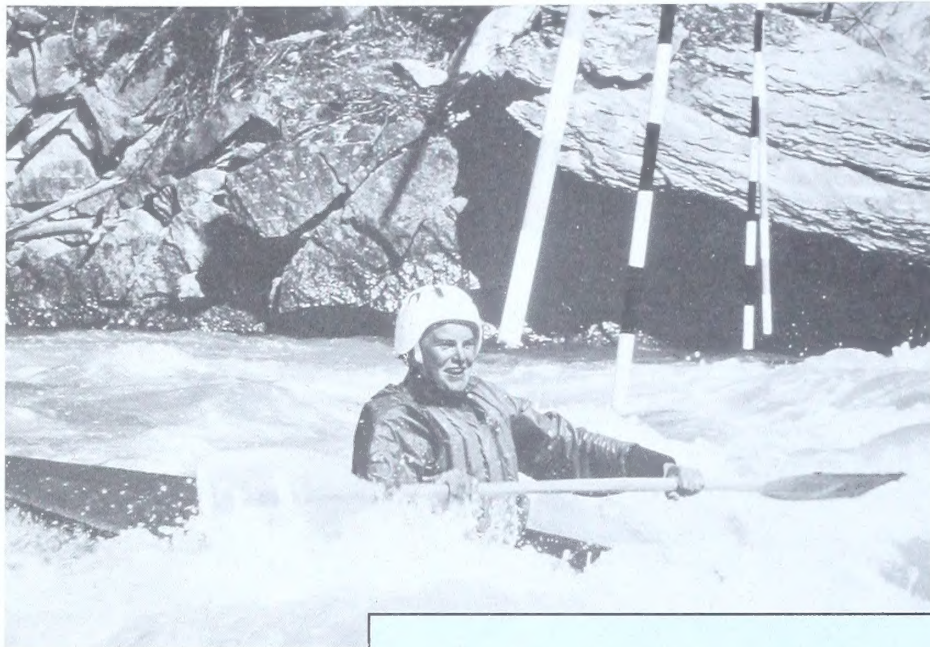
Dinosaurs roamed the vast outwash plains of rivers flowing from the young front ranges of the Rockies and their fossils have formed in the deposits of sand and silt laid down by those rivers.

Today, Alberta's rivers cut deeply into the plains as well as the mountains, cutting down the level of the land as they flow to the sea. Violent mountain streams roll monstrous boulders down their beds. Foot-hills rivers sweep cobble and gravel along with them. Rivers on the plains carry a heavy load of silt, and, in flood, these rivers seem capable of moving or destroying everything in their paths.

*I do not know much about gods;
but I think that the river
Is a strong brown god –
sullen, untamed and intractable.*

- T.S. Eliot in "Four Quartets," The Dry Salvages (1943)

Marion Schaffer in competition.



HUGH LECKY

Alberta's rivers don't just carve up and carry away our land mass; they create unique landscapes and habitats. Stewart Rood, chair of the biology department at the University of Lethbridge, points out: "With every twist and turn, the flowing water cuts down in some places but also builds up in others. Vegetation occupying the riparian (riverbank) zone requires fresh sand and silt to get established – willows and cottonwoods need root contact with the water table."

Since the ice age, river valleys have been long, sinuous oases of woodland snaking through the prairie grassland. Today, "you can hop on a Time Air flight from Calgary to Lethbridge and you see an environment that is largely artificial – a patchwork of almost continuous cultivation. But the river valleys remain relatively pristine," Rood says.

Rood also notes how a river passes through the ages of life the way a person does: from its birth in the mountains to its eventual death in the sea. Unlike a human being, the river shows all the stages of life simultaneously. "In its youth, the river is free, not yet dammed and diverted. Farther along, it car-

ries the burden of its past experience – cities, feedlots, railways. It has become old and rather sluggish and heavily laden by the time it hits the border."

Wild Water of Youth

Bob Smith, a specialist technician at the University of Alberta and former Canadian national whitewater canoe champion, has a

**// You can feel the incredible power
of the river below you. Stick the wrong part
of your boat or your paddle in
and you're history. //**

special relationship with rivers in their youth. "A river has texture, character, personality. It's always talking to you. Especially competing against it – or with it – you can feel the river's personality. You can take all the personality traits of a human being and apply them to a river."

Smith got his first taste of the rowdy adolescent personality of an Alberta river at Brierly Rapids on the North Saskatchewan at Rocky Mountain House. That was in 1978 when he was 22 and a fellow gymnast from the university persuaded him to ride a little whitewater. Immediately hooked, Smith competed in his first race in 1980, made the provincial team in '82 and was on the national team by '83.

A whitewater slalom course consists of a series of gates much like those set up for

skiers except the poles hang from wires strung between trees and high banks across the river. The canoeist paddles a C1 canoe, which looks like a kayak to the uninitiated, down the course through downstream gates, turning and crossing frequently to navigate upstream gates positioned at eddies every 30 metres or so along the course.

"You can feel the incredible power of the river below you. Stick the wrong part of your boat or your paddle in and you're history. I've been shot like a bar of soap across the bathroom floor – we call that an ender."

The canoeist works the whitewater entirely with his upper body, an imbalance Smith corrects by skiing cross-country and downhill in winter. He says that way he gets to use the water twice: "We use the white water all winter on the mountain and again in summer before we lose it."

***You could not step twice into the same
rivers; for other waters are ever flowing
on to you.***

- Heraclitus in On the Universe (ca. 500 BC)

Also up to his hips in fast-flowing foothills waters every chance he gets, Jim McLennan favors a more leisurely introduction to a river's personality. McLennan has nearly made fly fishing a way of life, co-founding in 1982 and still operating Country Pleasures, a shop in Calgary specializing in fly fishing gear. He wrote *Blue Ribbon Bow* in praise of that river's world-class trout fishery.

Where it flows through Calgary, the Bow has reached young adulthood. It has become wide and full but it still dashes clear, cold and with youthful vigor under the bridges of midtown and over the irrigation diversion weir on the east side.

"People assume the river isn't very good to fish in because it flows through 700,000 people. But the Bow has the largest native trout in North America outside of Alaska," Jim says. As he grew up in Edmonton, McLennan fished on and off with his father but when he got old enough to drive the family car, it became his passion. "Spring, summer and fall, if there was a way I could wangle to borrow the car, I was gone."

McLennan first fished the Bow just after finishing high school. "That kind of changed everything. There were lots of fish and they were all big. I went through a phase at the beginning where I would only fish the Bow. Most people do this for three years or so – why go somewhere else and catch small fish when you can stay

here and catch lots of big ones?"

Anglers say that attitudes toward fishing change as the angler matures. "Initially, catching a fish is 100 per cent of the fascination but as you mature, how you catch the fish becomes very important."

Figuring how to catch a particular kind of fish in a particular stretch of stream is a study in ecology. Dedicated anglers look for changes in water temperature, weather and food sources, and consider the insects and vegetation present, the speed and depth of the stream, nutrient levels and related factors they believe will help them select the right combination of gear and technique.

"I love to puzzle it all out and figure what the fish are doing in the water.

Catching a fish confirms my theories. "When you've done it, you have it always in your mind. You can call it up and relive it any time. Perhaps fishing occupies my mind more than it should but I never know what experience will come to mind when I'm lying in bed – it could be from Alberta or half way around the world."

(A river) has its own life and its own beauty and the creatures it nourishes are alive and beautiful also. Perhaps fishing is for me only an excuse to be near rivers. If so, I'm glad I thought of it.

– Roderick Haig-Brown in
A River Never Sleeps (1950)

Quiet Dignity

The river can be an experience of the mind and a test of the body but it can also sustain the lives of those who live by it. Gripped in the armlock of the Peace River at Carcajou, 180 kilometres north of the town of Peace River, Dennis Sivertson and his family farm 485 hectares of fertile bot-

tom land created by the river.

The long summer days and mild valley temperatures let Sivertson grow wheat and canola – a surprise to many southerners. "We often get our crops in a week earlier and off a week earlier than down south. We've even raised watermelons up here," Sivertson laughs.

His whole life revolves around the river.



JIM McLENNAN

// Figuring how to catch a particular kind of fish in a particular stretch of stream is a study in ecology. //

Sivertson went to school in Manning until he was 16. "I was kind of an orphan and I went with the lady who started the school in Carcajou and became the person who did the chores there."

The road reached Carcajou in the mid-'60s and by that time Sivertson had a trap line and a couple of years later had established a hunting camp 50 kilometres upstream. He has been taking 20 to 25 American guests there by boat each fall to hunt black bear and moose. His trap line still produces a good income, mainly from marten and beaver.

Sivertson married a daughter of the river. "My father-in-law ran the trading store across the river here in the thirties. He partnered with Sullivan from Peace River on one of the big boats that ran on the river until the fifties. Now the river isn't really used much for anything."

Over 30 years in Carcajou, Sivertson has seen the river change. First the Bennett Dam in British Columbia regulated the flow of water, diminishing the severity of flooding in spring. "The dam has taken away the higher waters we used to get in May. We didn't use to have all the mud we have in the



LYNDA McLENNAN

Fly fishing is one of the joys of the river at mid-life. Lynda McLennan (top) and Jim McLennan (above) sampling the world-class trout fishery on the Bow River.



Dennis Sivertson

river now. And lately, the water quality has really dropped. We used to drink the water out of the river at the hunting camp; now it makes us sick. Guests from Seattle used to take jugs of the water back with them but now we tell them not to. One day last year, the whole river turned to foam."

Sivertson also worries that increased licensing fees make it too expensive for average people to be able to hunt at his camp and access along new logging roads will reduce game populations in the area through increased hunting.

But Sivertson says he's like the animals of the Peace River valley, "I've got to be by water. I love the river, I love being near it. There's lots of poplar up and down the river – not that much spruce any more – lots of birch, willows, balm (balsam poplar), beautiful in the fall.

"We've got a little landing, my wife and I boat, our two girls water ski and swim there; it's all sand with a gradual slope and

hardly any current. We fish on the river for walleye and northern. When the river's peaceful and quiet, we go up to the hunting camp and stay there on weekends. I don't think anybody's got better summers than we have."

May the countryside and the gliding valley streams content me. Lost to fame, let me love river and woodland.

– Virgil in Georgics (ca. 50 BC)



Dennis Sivertson's Peace River, a river at a mature stage of its life.

By the time the Red Deer reaches East Coulee, now more like a sliding surface than a flowing volume under the old bridge to the abandoned Atlas Mine, it has reached the stage of life where dignity is a virtue not to be diminished by unseemly haste. The sun beating down through the cottonwoods on the terraced river bank shimmers the distant hoodoos and brings spring's first burn to the brows of hatless visitors sipping tea in Linda Digby's backyard.

A partner in Groundwork Natural Science Education, a company interpreting badlands and prairie geology, paleontology

// I've got to be by water.

I love the river, I love being near it...

When the river's peaceful and quiet, we go up to the hunting camp and stay there on weekends. I don't think anybody's got better summers than we have. //

and ecology to students and visitors to the Drumheller Valley, Digby waxes poetic about the river and her yard. Gesturing to the birds at the feeders, she says, "My backyard is studded with jewels. We've left the lower part of the yard alone, natural, we're sharing it with the wildlife.

"The river is a life stream, a blood vessel. It carries and concentrates life, especially in an arid area like this. From the air, the rivers and the vegetation along them look like green ribbons – alluring to birds, magnets for wildlife."

Not to mention the magnetic appeal to people of messing about in boats, watching wildlife and the river from your bedroom window in the morning as you take tea, skating out your back door in winter and, most important, swimming.

"You can't be in the badlands for any length of time without a river. This is just as true for people as it is for wildlife. You get home from a nature hike, head straight through the house, grab your suit on the way, walk out the back door and right into the water."

Having all this right outside the back door puts Digby and her husband smack in the hundred-year flood plain with a virtual guarantee that sooner or later the river will end up in their living room. "It's a little bit scary. The year before last the spring water level was within three metres of the house –



The swollen Red Deer River (right) threatened the Digbys' backyard in the spring of 1990. Above is the Milk River in southern Alberta near the Montana border.

what people here call spitting distance.

"The old timers would walk out to the bank every half hour, check the river, say, 'Nope, ain't near as bad as '38,' and head back into the house."

The Digbys are newcomers by valley standards, their bird feeders having survived only four spring floods to date. This dry valley with the liquid spine whose coulees protrude like ribs into the surrounding prairie is starkly unlike Digby's native California and her husband's English birthplace. "I don't think I could have survived Alberta without this lifeline running out my back door, she says.

"I like the dynamics of the river—every day it's different. Every time you look at it, there's something changed about it. It's unpredictable, out of control, not like the prairie farms all carved up into nice little squares."

Even in its old age, a great prairie river never reveals everything it knows.

ROBIN DIGBY



// The river carries and concentrates life, especially in an arid area like this. From the air, the rivers and the vegetation along them look like green ribbons – alluring to birds, magnets for wildlife. //

"The flow of the river is ceaseless and its water is never the same. The bubbles that float in the pools, now vanishing, now forming, are not of long duration; so in the world are man and his dwellings... (People) die in the morning, they are born in the evening, like foam on the water."

– Kamo no Chomei in *Hojoki* (1212)

Eric Bailey is a professional writer specializing in outdoor and interpretive writing, working from Lacombe.

LIFELINES

Tracing Human Life Along the Rivers



PROVINCIAL ARCHIVES OF ALBERTA PHOTO COLLECTION A10.642

**For as long as 8,000 years,
Indians in Alberta have been drawn to river valleys
for food, drinking water, and (in the North) transportation.
Teepees along the Peace River (above) and near
the Bow River (opposite).**

From the swift-flowing headwaters of the North Saskatchewan to the calm waters of the Battle, rivers have played a key role in the human history and psyche of Alberta for thousands of years.

Long before Peter Pond first set eyes on the Clearwater River in 1778, discovering the crucial link between the fur-hungry markets of Europe and the fur-rich Canadian West, native people depended on rivers and their valleys for shelter and game.

"By 8,000 or 9,000 years ago, the river valleys were sufficiently stabilized to be occupied by native Albertans," says Rod Vickers of Edmonton, plains archeologist with the Archeological Survey of Alberta.

By 6,000 to 7,000 years ago, archeologists are "fairly sure" that the major river valleys in southern Alberta formed an essential part of the "seasonal rounds" of nomadic native people. They journeyed across the land at different times of the year, searching for the best places to hunt and camp. Often they stopped at river valleys.

Camps going back 8,000 years have been discovered in Calgary near the Bow River, while camps between 5,000 and 6,000 years old have been found on the banks of the North Saskatchewan in Edmonton. Medicine Hat, Red Deer and many other river communities in Alberta were likely first occupied as temporary prehistoric camps.

"In summer, native people found rivers attractive for settlement, because most of the flowing water in Alberta is river-based, rather than lake-based," Vickers explains.

Through excavations of sites near southern Alberta rivers, archeologists have discovered flakes from prehistoric tools and

numerous other signs of seasonal use. For thousands of years, native people seem to have been attracted to camps within a mile of the margins of rivers, up on the prairie level.

"The breeze would keep the insects away and the bison would pass by on their way to drink water and then go back to the plains," says Vickers. "We always find huge numbers of sites along the edges of those valleys."

Archeologists think the prairie sites, situated above river banks, were used in summer or in fall. In winter, the river valleys themselves became essential to the survival

of native Albertans.

"The firewood and the shelter made the river valleys crucial in winter," says Vickers. "People might go into one of these big river camps in November and not go out until the end of March. So we're talking a very long period of occupation or semi-nomadic use."

Important as Alberta's southern rivers were for survival in prehistoric times, they played almost no role in transportation. In fact, says Vickers, rivers probably presented more of an obstacle than an opportunity. In terrain that was open and relatively easy to traverse, the unnavigable rivers held little attraction as water routes.

"In the north, it was just the opposite. The rivers were the main nexus for transportation, probably in both summer and winter."

Frozen rivers proved excellent for driving sled dogs. In summer the same rivers provided the only easy method of transportation in harsh terrain characterized by heavy forest and muskeg.

Noted historian and author Hugh Dempsey, chief curator emeritus at the

Glenbow Museum in Calgary, agrees that the province's rivers have played a markedly different role in southern and northern Alberta in both prehistoric and historic times.

"Plains Indians didn't use canoes or boats

Archeologist Rod Vickers pointing to evidence of an ancient campsite found along the Milk River.

of any kind, so the rivers were seen as sources of water, not transportation. With the native peoples north of Edmonton, the canoe was the main mode of transportation."

The rivers not only provided a source of transportation to northern woodland tribes, they were also a source of game and fish. In his book, *Indian Tribes of Alberta*, Dempsey describes a Chipewyan caribou hunt: "...one of the favorite means of killing them was by spearing them from canoes as they swam across rivers or lakes."

Not surprisingly, historians say the most significant role played by Alberta's rivers occurred during the fur trade era. Although fur-trading posts had been established in the 1730s in what is now Manitoba, Hudson's Bay Company traders did not travel inland for decades. Instead, they relied on experienced Cree middlemen to bring furs down river to the posts on Hudson Bay.

"In the fur trade era, the rivers were crucial transportation routes for the Indians in the interior," says John Foster, professor of history at the University of Alberta and former acting director of the Native Studies Department.

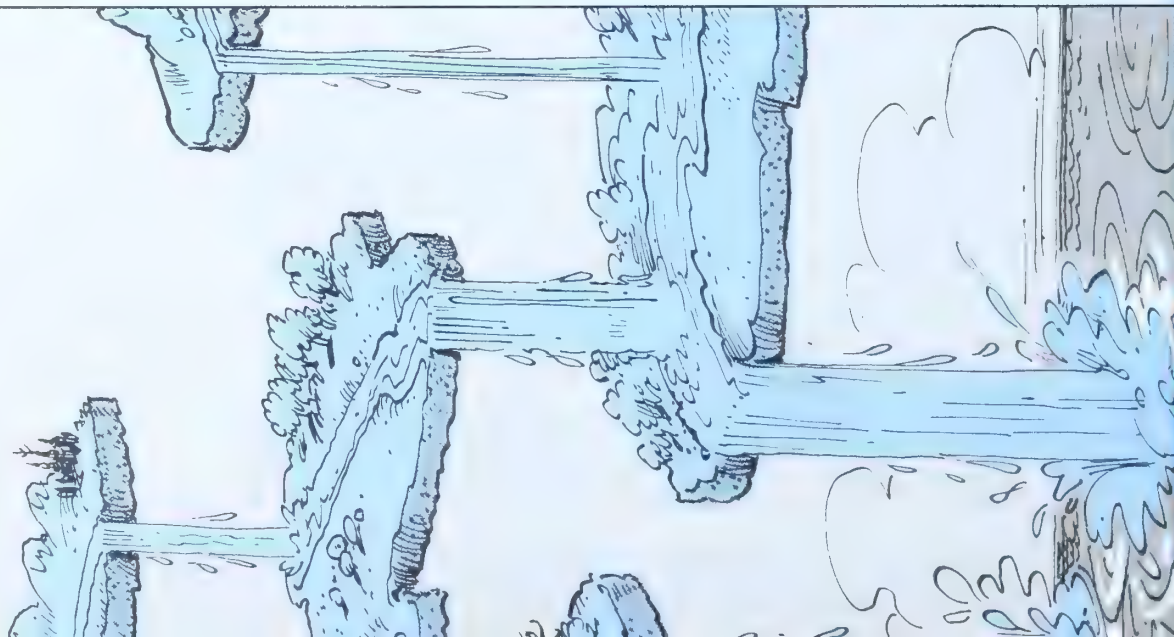
"This was particularly true of the trading Indians, who acquired furs from the hunt-

continued on page 15



PROVINCIAL ARCHIVES OF ALBERTA: BROWN COLLECTIONS 1020

So you've driven across a lot of bridges and read this issue of *Environment Views*, but what do you really know about Alberta's rivers? Test yourself against the experts.



WHAT DO YOU KNOW ?

1. What major river lies entirely in Alberta, from source to mouth:

A. the Peace **B.** the Athabasca **C.** the Slave **D.** the Bow

ANSWER/ B. From its source at the Columbia Icefield to its mouth at Lake Athabasca, the Athabasca River runs more than 1,200 kilometres through Alberta, and only Alberta. If you said the Bow you were close. It flows from Bow Lake at the foot of Bow Glacier about 600 kilometres through Alberta before joining the Oldman and becoming the South Saskatchewan near Medicine Hat, but strictly speaking it has no mouth in Alberta.

2. Rivers flowing through Alberta flow ultimately into the following bodies of salt water (check all that apply):

A. The Arctic Ocean **B.** Hudson Bay **C.** the Gulf of Mexico **D.** the Pacific Ocean

ANSWER/ A, B, AND C. The Slave River takes the

waters of the Peace River and the drainage from lakes Claire and Athabasca to Great Slave Lake, which in turn drains into the Arctic Ocean through the Mackenzie River.

B. The North and South Saskatchewan rivers join to form the Saskatchewan, which drains through Cedar Lake, Lake Winnipeg and the Nelson River into Hudson Bay. **C.** The source of the Milk River lies in Montana, but it flows through the southeast corner of Alberta before recrossing the border and joining the Missouri in Montana, which carries the waters of the Milk south to the Mississippi and on into the Gulf of Mexico. **D.** The Continental Divide separates Alberta's rivers from the Pacific, but the Peace does flow eastward through the Rockies into Alberta.

3. You should expect a once-in-a-hundred-years flood once every hundred years.

TRUE OR FALSE

ANSWER/ FALSE No, this is not a "What color was Napoleon's white horse?" kind of

ANSWER/ YES. Mountain whitefish from certain stretches of the Smoky, Little Smoky and Kakwa rivers, or from any part of the Wapiti, Cutbank and Simonette rivers, should simply not be eaten because of dioxin and furan contamination. Kraft pulp mills are the primary industrial source of dioxins and furans, while mercury contamination in Alberta's waters apparently comes primarily from naturally occurring soils and sediments.

6. If you pour toxic household or industrial waste down your corner storm sewer, will it pass through your sewage treatment plant before running into the river?

A. probably not **B.** it probably will **C.** always, by law **D.** never?

ANSWER/ A. According to an Alberta Environment survey a year ago, Edmonton and Red Deer have the only "combined" sewers, where both runoff and sewage empty into the sewage treatment plant. What's more, only 25 to 30 per cent of Edmonton's sewers are combined, and Red Deer has only a few city blocks of combined sewers. Everywhere else in Alberta, the storm sewers go straight to the river.

7. Where does the Oldman River get its name:

A. from the bald prairie landscape through which it flows **B.** from the Blackfoot creator **C.** from the old song from Showboat made famous by Paul Robeson?

ANSWER/ B. The Peigan people call the river Napi, or Oldman, to remind themselves of the Creator's near loss in a gambling match with Westside Man, the creator of peoples west of the mountains, in a meadow at the headwaters of the river.



Oldman River in flood.

8. On what river did fur traders first paddle into what's now Alberta:

A. the South Saskatchewan **B.** the Red Deer **C.** the Peace **D.** the Clearwater?



Crowsnest River

HOW DID YOU DO?

FLOTSAM:

(8 to 10 correct answers)

Congratulations! You floated to the top. You take home the coveted "Voyageur Prize", redeemable at truck stops across the nation.

NEITHER FISH NOR FOWL:

(5 to 7 correct answers)

No prize for you; you're just middle-of-the-river.

BOTTOM FEEDERS:

(0 to 4 correct answers)

You win the "Rivers be Dammed Prize", otherwise known as the "Award of Effluents." Study, study, study.

Thanks for expert help to: retired educator and historian John Chalmers; Stewart Rood, chair, Biological Sciences, University of Lethbridge; Andy DeBoer, a hydrologist with the Hydrology Branch of Alberta Environment; The 1992 Alberta Guide to Sportfishing; David Spink, head of the Municipal Branch, Standards and Approvals, Alberta Environment; Betty Bastien of the Blackfoot Confederacy; Daryl Watters, a fisheries technician with Alberta Fish and Wildlife in Edmonton; Anne-Marie Anderson, a biologist with Alberta Environment.

average once every hundred years or so. But that doesn't mean once you've been through a flood of that magnitude you're safe for another 99 years. There is an equal chance of such a flood in any given year. If your luck is running badly, you might get the next thousand years' worth all in the next decade.

4. Alberta ranks among the top three provinces in Canada for irrigated agricultural acreage. Does Alberta rank:

A. first **B.** second **C.** third?

ANSWER/ A. 62 per cent of Canada's 1.85 million irrigated acres lie within Alberta, and 90 per cent of that total lies within the Oldman, Bow and Red Deer basins. British Columbia ranks second with 16 per cent of the national total, while Saskatchewan ranks third with 11 per cent. The Niagara triangle you ask? Only about seven per cent of Canada's irrigated lands lie within Ontario.

5. It's no secret that, because of dioxin, furan and mercury contamination. Fish and Wildlife advises against frequent consumption of some species of fish from some of Alberta's waterways. Are these problems serious enough that any fish are now classed as entirely inedible:

YES OR NO?



Milk River



ward-flowing river route between Winnipeg and the Rocky Mountains. In 1778, independent trader Peter Pond entered the Athabasca country on the Clearwater River, then spent the winter trading along the Athabasca River near what is now Fort McMurray. Hudson's Bay employee Henry Kelsey may have travelled as far west as the Red Deer River in the early 1690s, but he came by foot across the prairies and was exploring rather than trading.

9. What species of fish in Alberta's rivers grows the largest:

A. northern pike **B.** sturgeon **C.** burbot?

ANSWER/ B. Sturgeon grow bigger than anything else in the rivers or lakes, and they have no predators except man. Biologically primitive and (to most eyes) ugly, they feed on the bottoms of the North and South Saskatchewan rivers, finding food in the murky water with the hair-like barbels under their chins. The Alberta record was caught in the South Saskatchewan in 1982: 155 centimetres and almost 48 kilograms. A 161-centimetre sturgeon caught last year in the North Saskatchewan was 62 years old. Sturgeon anglers need a special licence, and their yearly limit is two. Although sturgeon more than one metre can legally be kept by licenced anglers, catch and release is always the best policy. These fish spawn only once every five years, beginning when they are about 20 years old, so over-fishing is always a threat.

10. How many species of invertebrates are found in Alberta's rivers:

A. 26 **B.** more than 200 **C.** thousands?

ANSWER/ C. Thousands of species of insect larvae, crustaceans and other invertebrates live in rivers throughout the province. Invertebrates are a whole ecosystem in themselves. They feed on organic matter in rivers — including each other — and in turn feed many species of fish. Populations of invertebrates tend to be highest downstream from organic effluent discharges from, for example, municipalities and pulp mills. Invertebrates feed on effluent, breaking it down and effectively cleaning the rivers. Bottom feeders among them, however, also ingest sediments contaminated by pollutants such as dioxins, and so provide the first step in concentrating those contaminants in fish higher up the food chain.



Edmonton, May 29 - June 6

Learn more about the arts, the vitality of downtown Edmonton and the health benefits of walking by participating in *The Great Edmonton Downtown Scramble*, a foot rally on June 6. Head to Hawrelak Park May 31 for the *Edmonton EnviroFest*. Watch for *Green Visions Edmonton*, a two-day workshop May 29 and 30.

Edson, June 4

Come out to a *Family Festival* with the visting Imagination Market from Edmonton.

Fort McMurray, June 3, 4 and 5

It's *Waterless Wednesday* June 3 and you're encouraged to conserve water. On June 4 it's *Transit Thursday*, so take the bus around town. Come out to the public forum at Fort McMurray Regional Hospital June 5 on Sustainable Development in Fort McMurray.

Athabasca, May 30

Don't Trash It, Cash It and participate in the community garage sale at the Athabasca Elementary School.

Barrhead, June 2

Learn how to compost June 2 at the *Green Gardening Seminar and Compost Building Workshop* at the Barrhead Public Library.

Brooks, June 2 and 3

Begin May 31 with a *Tree Planting Picnic* at the newly created natural environment park. On June 3 watch for the *Mayor's Recycling Tour*. On June 2 and 3, Brooks Primary School students and Trout Unlimited will paint fish symbols on storm drains, to serve as year-round reminders of the connection between these inlets and the natural environment.

Grande Prairie, June 6

Participate in the *Bear Creek Reforestation Event*.

Calgary, May 31 - June 7

Start the week with a *Share the Earth Triathlon* and *Share the Earth Festival* May 31. The third annual *Mayor's Environmental Expo* is on for June 2-4 at the Calgary Municipal Building. Grassroots Calgary is hosting a *Kids' Garden Party for Mother Earth* June 7 at Riley Park to start off the new *Lawns for Kids* campaign.

Crowsnest Pass, June 2 and 6

The *Going Green Recycling Blitz and Composting Promotion* and ecotours on such topics as spring wildflowers and bird watching are on the agenda as Crowsnest Pass hosts Environment Week celebrations for the first time.

Drayton Valley, June 3 and 4

Hands On Environment Conference will help participants learn practical approaches to local environmental concerns.

Water conservation is the other major focus, as high school students research, develop and implement home water audits in 30 to 50 households.

Slave Lake, June 3 - 7

Participate in the *Walk, Ride but Don't Drive Day* June 3. There will be an *Environmental Fair* June 5 and 6 at the Sawridge Plaza and a *Community Bike Ride and Picnic* at Schurter Park June 7.

Medicine Hat, June 3

Waterless Wednesday picks up the week-long theme *Water - Our Most Precious Resource*. The Chinook Canoe and Kayak Club is sponsoring a lecture on *Rivers are More Than Just Water*, with Kevin Van Tighem as guest speaker.

Morinville, June 6

The winner of the Eco-Logo decal contest will be announced at the *Picnic in the Park* at the Morinville Curling Club and Frontier Daze grounds.

Lethbridge, June 7

It's the *Environmental Awareness Fair* from 10 a.m. to 5 p.m. at Henderson Lake Park.

Peace River, June 7

A *Riverbank Cleanup and EnviroFair* wind up the week's activities, which include an *EnviroSwap* of household cleaning products and garden supplies.

Pincher Creek

Listen to town and area residents on an open line talk show on environmental topics daily on CKIZ. Other activities include Central School primary students and their *Garbageless Lunch Competition* and tours of the Oldman River project with the Southern Alberta Science Society.

Red Deer, June 7

It's *Share the Earth Day* at the Kerry Wood Nature Centre, with a garden party, interpretive programs and a stage performance by Precipice Theatre.

Hastings Lake, June 7

It's the *Hastings Lake Environment Festival* and the theme is *Cooking Lake Moraine: Past, Present and Future*.

Emerald Awards to Sparkle

Alberta's awards to recognize achievement in environmental protection have a new name.

They're called the Emerald Awards instead of the Alberta Environment Awards. The award program is now the project of the newly formed Alberta Foundation for Environmental Excellence, founded by McLennan Ross Barristers and Solicitors, Deloitte & Touche Chartered Accountants and Alberta Environment, in co-operation with the Environmental Resource Centre.

Achievement in the areas that protect, promote, restore, enhance or contribute to the elements of the environment will be recognized at the Emerald Awards dinner June 1.

Environment Minister Ralph Klein described the foundation and the awards as "an ideal progression of the former Alberta Environment Awards.

"It brings government and the private sector into a meaningful partnership, recognizing the environmental achievements of Albertans. We wish it every success."



ing and trapping Indians and moved down the river systems to Hudson Bay and then back. For more than a century this was a principal activity affecting the Indians in Western Canada."

Significantly, when Alberta archeologists are asked to pinpoint the moment when European civilization irrevocably penetrated Alberta, they're apt to identify Peter

present-day Alberta in 1778, on the Athabasca River. It was the first of a string of more than 60 North West Company and Hudson's Bay Company forts ranging from Fort Chipewyan in the Athabasca region to Fort Edmonton and Rocky Mountain House on the North Saskatchewan.

"The fur trading routes followed into the west were on waterways," Dempsey notes.

The signing of Treaty Seven took place on the bank of the Bow River near Cluny, 90 kilometres east of Calgary.

Although its waters have always been variable for navigation, "the river had its day as one of the greatest highways of discovery on the continent, perhaps in the world," writes Marjorie Wilkins Campbell in her book, *The Saskatchewan*. It was "a swift, glorious, unforgettable day."

Campbell notes too that the Saskatchewan "did nicely for canoes. Great, flat York boats managed because they were built to meet its limitations."

The discovery of the main waterways of the North Saskatchewan, Peace and Athabasca systems fuelled the ruthless competition of the fur trade era. In *Alberta, A New History*, Howard Palmer writes that the period "often led to violence and debauchery as the fur trade became soaked in rum."

The north branches of the Saskatchewan and Athabasca rivers formed the main battlegrounds: "Traders could expect to have their trading goods and canoes destroyed and their tents slashed to ribbons."

During this period, and likely long before, rivers also acted as boundaries for native people, although they were not fixed. The North Saskatchewan, for example, was

// Plains Indians didn't use canoes or boats of any kind, so the rivers were seen as sources of water, not transportation. With the native peoples north of Edmonton, the canoe was the main mode of transportation. //

Pond's 1778 sighting of a river basin rather than Anthony Henday's earlier reconnaissance into central Alberta in 1754.

The reason? Pond became the first known white person to discover the Clearwater River and its basin. That discovery connected the Hudson Bay drainage system and the Athabasca and Arctic drainages, opening the northwest to the European fur trade.

Pond himself built the first trading post in

"For Alberta, that meant the North Saskatchewan, Peace and Athabasca systems."

Of Alberta's many rivers, Dempsey says the North Saskatchewan has most influenced human exploration and settlement. More northerly systems were too remote to have the same impact as the North Saskatchewan, site of the original Fort Edmonton. More southerly systems have always been too shallow or impractical for serious navigation.

seen as a boundary for the Blackfoot, but that line shifted to the Battle River and then the Red Deer River in the 19th century.

The fierce competition mostly ended when the North West Company and the Hudson's Bay Company merged in 1804. Then, as the fur trade era came to an end in the 19th century and settlement began, Alberta's rivers began to play a smaller, but nevertheless vital, role in the development of towns, cities, agriculture and industry.

"After the west was taken over by Canada by 1869-70, the plan, of course, was to build the CPR and other railroads," says Dempsey. "And they did not make use of the waterways at all. They went as straight across the country as they could.

"But once they were established, the CPR and then the Grand Trunk Pacific later, there was a tendency for settlers coming in to seek good water supplies. So it became reasonably common for people to settle where there were rivers."

Red Deer, for example, quickly appeared on the scene after Fort Edmonton had already been established and the CPR went through Calgary in 1883. The reason, says Dempsey, is because it was on the Red Deer River, and therefore an important source of water.

Historians agree with archeologists that

in Alberta, rivers generally haven't really been that important in navigation except in the north. In fact, notes Foster, the rivers could often be major barriers for settlers at certain times of year, demanding dangerous fording or time-consuming detours to cross them.

One colorful aspect of Alberta's history, soon to be revived in Edmonton, is the steamboat era. Although steamboats ap-

Athabasca River.

Until the Second World War, the transportation route to the Northwest Territories was by rail to Fort McMurray, which was at the end of the line. From there, boats took supplies up and down the Athabasca River and then eventually into the Peace system and over to Great Slave Lake.

"Roads were more or less impractical, there's a lot of muskeg and generally condi-

// The fact that

Alberta is located on the eastern watershed has given it responsibility, because many of the rivers in this area are simply passing through. //

peared on the North Saskatchewan in 1880, they weren't particularly important, he says.

"But farther north, on the Peace River system and the Athabasca River and Lesser Slave Lake, steamboats were important until quite recent years."

For decades the railway, for example, only went as far as Athabasca Landing. Then steamboats journeyed across Lesser Slave while other steamboats plied the

tions for travelling were much simpler by water than by any other means," Dempsey says.

He notes that it wasn't until the building of the Mackenzie Highway in the 1950s that the first real road transportation to the Northwest Territories became a reality.

Although rivers weren't important for transportation in southern Alberta, they still had a significant impact on settlement pat-

Heritage Rivers

Our whole history is based on rivers. "People have lost that connection," says Margaret Lounds, chair of the committee advising Alberta's Minister of the Environment on whether Alberta should participate in the Canadian Heritage Rivers Program (CHRP). Its view is clear: "We have unanimously supported Alberta's participation."

The Canadian Heritage Rivers Program, launched in 1984, now involves eight provinces and both territories. Alberta and British Columbia are the holdouts. Both monitor the program's progress closely, and Alberta Environment Minister Ralph Klein recently announced that he will take Margaret Lound's committee's recommendation to cabinet.

Rivers nominated to the heritage

program must stand out for their natural features, human history or recreation value. Once a river has been designated a heritage river, the program works to educate the public about its value, promote it as a tourism resource and bring users of the river together in a co-operative setting to negotiate its protection. Alberta's hesitation in joining, says Lounds, results from "a concern about potential federal intrusion into provincial matters."

The program's board and secretariat recognize this concern and hope that it will not block Alberta's participation. Mike Greco, senior planner with the Canadian Heritage Rivers Program secretariat in Hull, says the program's goal is not to manage rivers, but to enhance their value in co-operation with the provinces. "The whole attitude of the board is a friendly, congenial one. It's not there to interfere with the values of a province or territory. It's not there to fight them."

The Alberta committee recommends

that rivers be nominated by a local authority – such as a municipal government, a regional planning commission, or a band council – rather than by a provincial special-interest group. "It's important to have all the potential stakeholders at the table to talk about what a nomination means," says Lounds. "If you don't have that level of co-operation, it doesn't work."

The committee also reassures those who worry that participating in the Heritage program will restrict opportunities for development. "We believe very strongly that that's not a problem, says Lounds, "because Alberta has the most stringent environmental requirements on the use of rivers of any jurisdiction in North America. This is an initiative our committee believes has great potential to benefit Albertans without seriously impeding current or future opportunities for development."

Lynn Zwicky

terns. In the 1880s, the first ranchers took leases in the foothills, in areas where water was plentiful.

Only in later years, as that land became settled, did ranching in dryland areas become possible through the use of dug-outs and reservoirs.

"The control of water was absolutely critical," says Foster. "One could threaten to lock up a major block of grazing land simply by taking ownership of crucial water resources in the area."

Fair allocation of water rights became the subject of extensive investigation and legislation early on. Regulation of such a principal resource, says Foster, makes "an interesting comment on the kind of society" that emerges. Albertans today still benefit from the legacy of those decisions. In Alberta, for example, private property adjoining a river extends only to the high water mark. The rest is public property.

"We profited in many ways from the problems the Americans had in their West," Foster says. "The Americans allowed vast areas to fall into private hands, and the resulting tensions explain some of the wild and woolly features of the American West."

Some types of early industry also depended on rivers. The early logging industry, for example, frequently harvested timber in the mountains and then floated logs to sawmills on rivers such as the Red Deer.

"For them, the rivers were extremely important," says Dempsey.

As more and more settlers flocked into Alberta, towns and cities near good sources of water were those most likely to grow. A limited water supply continues to place restrictions on potential expansion.

Today, as the province prepares for the next century, Alberta must continually be aware of its obligation to safeguard the quality of its many rivers, says Dempsey.

"The fact that Alberta is located on the eastern watershed has given it responsibility, because many of the rivers in this area are simply passing through. One has to be conscious of the effect that anything done here could have on the downstream areas of either Saskatchewan or the Northwest Territories."

Foster agrees: "We're used to treating our rivers like they do in parts of the United States and Europe.

"We're still having problems in making choices about what our rivers are for. We may have to do some pretty basic rethinking."

Gail Helgason is an Edmonton writer and co-author of several outdoor guides to Alberta.

Lynn Zwicky

PLUMBING PROBLEMS

How We Have Shaped Our Waterways



Above the irrigation reservoir on the St. Mary River in southern Alberta, the river floods periodically, sustaining a lush growth of cottonwoods.

For years, our rivers have been so much plumbing: we have taken water out of them, dumped waste into them and we have done what we can to keep the pipes from leaking.

But water management in Alberta is

changing. The Oldman Dam controversy and the AIPac hearings focused public attention and environmental concern on water management issues in Alberta as never before.

Kevin Van Tighem is an environmental activist who organized the 1989 and 1991

Flowing to the Future conferences. His purpose was to end the name-calling between environmentalists and government that had erupted over the Oldman Dam and threatened to erupt again over pulp mill development.

Van Tighem has been an outspoken critic of government water policy but he now sees room for optimism: "We are beginning to look at rivers in a sustainable, holistic way – not just as funnels."

What are we doing to our rivers? And what are water managers doing better?

The Garden Hoses of Southern Alberta

Below the reservoir on the St. Mary River in southern Alberta, fall comes early to the cottonwoods. By mid-summer, the water trickles by and the leaves are yellow and curling and falling to the ground.

"The forests are almost dead," says Stewart Rood, chair of biological sciences at the University of Lethbridge. "The St. Mary is history – it's already gone. It's not a case of potential over-allocation. It's a case of severe over-allocation." The problem is that the demand for irrigation water has outstripped the supply.

"It's only in the last five or 10 years that we've recognized that there is a limit to how much water can be withdrawn without a severe impact on the instream environment," says Rood.

The Oldman Dam did a lot to bring public attention to river management issues, he believes. "We're recognizing that water flowing down a river has inherent value. The whole area of instream flow needs results from this."

Instream flow needs – or IFN – is the measure of the water a river needs to survive. It is not the same from one river to the next, or even from one season to the next in the same river. River plants and animals are in balance with seasonal cycles of floods and droughts. IFN is a way of analysing these cycles and drawing the line on how much they can be altered.

A quick way to calculate IFN is to look at the historical flow statistics on a river and say that some percentage must remain untouched. A more complicated way uses computer models to predict how the river ecosystem will change with changes in the water level and flow.

The South Saskatchewan Water Management Policy, announced in May 1990, used IFN to cap irrigation from the parched rivers of the south. It recognized the need to

protect basic water quality and instream needs.

Will this put water back in the St. Mary? Probably not, or at least not yet. The province has promised to respect the rights of those already taking water from the river.

"IFN is the first thing in water management that recognizes the river is a living entity," Kevin Van Tighem says. "It is a



DR. STEWART B. ROOD

Below the reservoir on the St. Mary, over-allocation of the river's flow to irrigation has let grasses take over where once cottonwoods grew.

valuable way of moving toward a vision of what rivers should be, but it is not the vision. Our rivers should be the best that we can dream, not the least they have to be to survive."

Water rights are defined under the Water Resources Act, now up for revision. The act says you must have a licence to take water out of a river. The problem is that the licence has no time limit and cannot be bought or sold. Once the act has allocated the water, there is no way to get it back.

"The problem in water law is what to do in the case of over-allocation," notes Rood. IFN is new, but irrigation has been around for a century. Legally speaking, rivers just got in line too late to get their share. "It seems very unlikely that the water will be

returned to the rivers," he concludes.

"We've been studying that matter," says Bruce MacLock, director of Planning Division, Water Resources Management Services of Alberta Environment. He believes the answer to putting water back in parched streams is in changing the act to allow water licences to be bought, sold or somehow transferred from one user to another. "I'd say the likelihood over the next 25 years is fairly good that water will begin returning where judged necessary." A market in water licences would allow other users – including anglers or conservation groups – to buy back water from irrigators to restore a river.

MacLock says in parts of Australia, when a water licence is sold, the state takes 10 per cent of the water off the top to put back in the stream.

Straight and Steady – Flow Regulation

IFN is also being used to define what is needed to protect river ecosystems downstream of hydro dams. Hydro dams change the flow regimes on rivers. They capture spring runoff and release it slowly over the year to keep the turbines going. The result is an end to spring floods.

The effects on the Peace-Athabasca delta from B.C.'s Bennett Dam have been severe. "It's drying up before our eyes," says Dave Milne, the park warden in Wood Buffalo National Park who oversees work on the delta. It's the biggest inland freshwater delta in the world, an important staging area for birds and a World Heritage Site.

The delta is a series of low-lying lakes and wet meadows. Water in the meadows is replenished by overland flooding. According to Milne, the last flood was in 1974. Wildlife in the delta is on the decline. "There were areas that used to support muskrats in the hundreds of thousands that are now bone dry," says Milne.

Bruce MacLock: "In our discussions with B.C. on managing the Peace, we have gone ahead and calculated minimum instream flows in the hopes of rehabilitating the river and the delta." According to Dave Milne, those discussions have taken a turn for the better. B.C. Hydro is involved for the first time. The utility was represented at a technical workshop organized by the Canadian Parks Service in May to talk about rehabilitating the delta. Milne says, "It's quite encouraging."

The Bow is another river feeling the effects of hydro dams. There are 14 hydro

dams in Alberta; 11 of them are on the Bow River upstream of Calgary.

"We're not really sure what effect this will have," says Stewart Rood. "Rivers, particularly prairie rivers, are dynamic things. They're always moving back and forth across the flood plain and that meandering is primarily driven by flooding. The meandering creates new sand and silt bars which are the principal sites for the recruitment of new cottonwood forests. If you stop the meandering there will be a progressive decline in the forests over time." Cottonwoods, he explains, live 100 years at most. When those trees die out, there will be none to replace them if the natural pulse of the river is not restored.

"Flooding the cottonwoods is not hard to do," says Lyle Nelson, supervisor of water management for TransAlta Utilities. "We don't know what flows are needed – how much or how often." Bruce MacLock says that information will come from an IFN study of the Bow, the first steps of which are under way.

"If it's the right thing to do and our customers don't have to pay for it, then we're for it," says Nelson. But, he adds, if the amounts of water required affect generation, then the utility will have to be compensated. That means transferable water rights, according to MacLock, that would "allow people from NGOs like Trout Unlimited or the Sierra Club to buy water for those pulses."

Hydro dams alter flows on rivers incidentally – we want the electricity, not so much the changes in the way the river behaves. We also, however, alter flows on purpose to

keep the plumbing pipes from bursting.

According to an August 1991 survey, there are 40 dams and reservoirs in Alberta that regulate flows, and 180 flood and erosion control projects that make up almost 1,000 kilometres of "channelization" – bulldozer straight, no-nonsense re-routing to cut off meanders. Sixty per cent of those

// Our rivers should be the best that we can dream, not the least they have to be to survive. //



St. Mary River in flood.

projects are in northern Alberta.

Flooding and erosion are Peace country problems. It's partly a legacy of agricultural development. When the trees came off, the land shed water more quickly. But not quickly enough for farmers anxious to get a quick start on a short growing season. In the spring, they drain the land. The rivers and streams are quickly overloaded. Add highly erodible soils to the problem and you've got a silty mess.

"A lot of water comes down these prairie rivers in runoff or during storms and it fills them right up," explains John Campbell, head of project co-ordination, Development and Operations Division, Alberta Environment. "You have these erodible soils – and away she goes. There was one case up there, the river moved three or four hundred feet one spring and a farmer's field was gone."

Campbell is tired of being the fall guy in this situation – of being blamed for messing up the river with bulldozers and concrete when the river was already messed up. "We're taking it in the neck because we're providing so-called structural solutions. Meanwhile, we're out there trying to solve some of the problems." He points out that erosion control projects, such as channelization, cut down silt loading in streams. Silt can be



Cottonwood forest along the Milk River.

hard on fish spawning beds. "Is that positive? The next person may not think so. It's not 'natural.' But maybe that erosion was caused by water coming in too fast in the first place."

The Big Flush

Rivers are the toilets of our cities and industries. The effluent goes in, the river flushes it away.

There are two big sources of effluent in Alberta: municipalities and pulp mills. The effluents are similar in some ways: they contain organic material, phosphorous and nitrogen. In the right mix and concentrations, they act like fertilizers. Aquatic life blooms in their wake.

Downstream of Calgary, nutrient loading actually supports an internationally recognized trophy fishery. "It's very easy to look at fish above and below the sewage treat-

ment plant and see the difference in the number and size of fish," says Garry Szabo with Trout Unlimited. "There would be a lot of upset anglers if there was no nutrient enrichment from the city." It was not always so. Before the city installed tertiary treatment in 1983, fish were dying.

Most municipalities only provide for primary and secondary treatment of sewage. Primary treatment removes solids with screens and with settling ponds. Secondary uses bacteria to reduce the amount of organic matter in the effluent. Until now, tertiary treatment has been too expensive to be universal.

Tertiary treatment in Calgary costs about two million a year in chemicals alone, according to David Spink, head of Municipal Branch, Standards and Approvals, Alberta Environment. By contrast, a new bacterial method is much cheaper if it is designed into the secondary treatment plant from the start. "It's a one-time capital cost, relatively small at the design phase, and makes virtually no difference to operating costs once in." Since 1988, the new tertiary treatment to remove phosphorous has been required on all upgrades and expansions of sewage treatment plants in Alberta.

The push for tertiary treatment reflects a

new attitude. The ability of a river to handle nutrient loading is no longer the issue. "In some cases, you'll see an improvement. In other cases, the effect on the river will not be that obvious. There will be little impact on the North Saskatchewan, for example. We're saying, regardless of the impact, the technology is there to control these discharges and it's affordable, so we want you to do it."

While we have the gross effects of water pollution under control, our understanding of what sewage does to rivers is far from complete. "We don't have a handle on the subtle effects, says David Spink. For example, we can't find any chlorinated organics,

come up with the goods. The study — announced last fall — was a direct result of information gaps identified at the AIPac hearings.

"Our purpose is to create a uniform database so rivers in the Peace-Athabasca-Slave basin can be monitored intelligently," says Doug Ferrier, study director. Meanwhile, development goes on. Ferrier says, with a note of frustration in his voice: "Everybody's commented on how it would be nice to have the study results before development goes ahead. One of the reasons for the study was concerns about developments like AIPac. All we can do is react to that and do the best job we can."



Field work has begun for the Northern River Basins Study. This contract crew is collecting sediment samples from the floor of Lake Athabasca.

There were areas
(of the Peace-Athabasca delta) that used to
support muskrats in the hundreds
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now bone dry.

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Tertiary treatment in Calgary costs about two million a year in chemicals alone, according to David Spink, head of Municipal Branch, Standards and Approvals, Alberta Environment. By contrast, a new bacterial method is much cheaper if it is designed into the secondary treatment plant from the start. "It's a one-time capital cost, relatively small at the design phase, and makes virtually no difference to operating costs once in." Since 1988, the new tertiary treatment to remove phosphorous has been required on all upgrades and expansions of sewage treatment plants in Alberta.

The push for tertiary treatment reflects a

such as dioxins and furans, in fish tissue downstream of municipalities, but they are still there. "They've got to be there. They're in the waste water going in. Right now it's below detection but if we wanted to make a research project out of it we'd find lots."

We are, of course, finding lots downstream of pulp and paper mills. The 1992 *Alberta Guide to Sportfishing* advises against eating mountain whitefish in several northern rivers because of dioxin and furan contamination from pulp mills. But chlorinated organics are not the only concern. According to Scot McClure, head of Water Quality Branch, Standards and Approvals Division, Alberta Environment, the effluent load from Alberta's six pulp mills is as heavy as the effluent from all of Alberta's municipalities combined. Can the northern rivers handle it?

With AIPac looming large, and the new Grande Alberta project proposed for the Smoky River, it's a question that needs an answer.

The Northern River Basins Study has \$12.3 million and three-and-a-half years to

"The final report will have recommendations," Ferrier notes. "Everything that comes out of this study is public information. It's a completely open process. It will be very hard not to act if significant action is called for."

What if the data show that the Athabasca can't swallow an AIPac? "The AIPac mill is going to get its numbers with respect to its pollution permit from the work of this study. They understand that the numbers may be fairly tight," says Bruce MacLock. "They would have to start marching toward near-zero discharge."

"The Northern Basins Study and IFN are two of our better guarantees of intelligent licensing based on biophysical understanding," says MacLock. "There are some big bucks that have been floated into the water management area. In the face of what's going on up and down Canada, we are spending a fortune."

Lynn Zwicky is the researcher for Environment Views and a board member of the International Institute for Sustainable Development.

North Raven Success Story

"For those of us who fish it a lot," says Barry Mitchell, publisher of the *Alberta Guide to Sportfishing*, "the North Raven is the ultimate."

Yet 20 years ago this little river was a mess: shallow, warm and choked with silt. In 1973, Fish and Wildlife Division launched the North Raven River Habitat Restoration Program and began enlisting the support of local landowners in rehabilitating the river's trout habitat. Since 1985, Barry Mitchell and some 50 other Trout Unlimited volunteers have also pitched in with hundred of hours reseeding grass, armoring corners against erosion with willow bundles and building willow groins to narrow the watercourse and flush away silt.

Today, along most of its length, the North Raven is restored nearly to the shape it was in before the province was settled. It runs deep and cool along a narrow, gravel-bottomed channel, with corners that hold deep pools through the winter. In short, trout paradise.

Before

The North Raven River springs from the earth north of Caroline and meanders a little over 34 kilometres southeast before flowing into the Raven River. As one of the province's handful of spring-fed streams, its flow level stays remarkably constant. Without floods, not much silt gets into the North Raven in the natural course of events. But by the late 1960s, land use practices along the North Raven had badly damaged the river. Along some stretches, trees and brush were cleared right down to the water. Along others, cattle grazed the banks and watered in the stream.

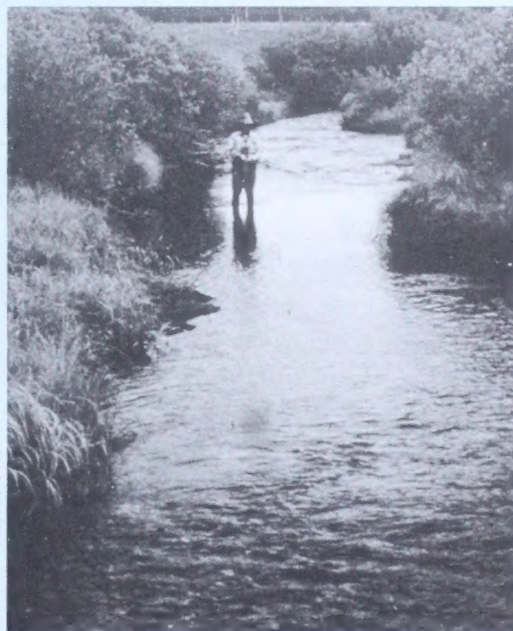
With the plants gone and the cattle trampling the banks, erosion broadened the river to four or five times its natural width in some places. Silt sifted in; plants sprouted. Sluggish, warm

ponds lying on a metre of silt replaced deep, cool, gravel-bottomed channels.

During

Then came the Habitat Restoration Program. Using money from the "Buck for Wildlife" program – which now gets \$5 from each fishing licence sold and \$11.50 from each hunting licence – Fish and Wildlife set out to follow a simple strategy: fence along the river to keep cattle out, replant the banks and narrow the watercourse to speed the flow.

Simple in theory. In practice, individual landowners and leaseholders



FISH AND WILDLIFE DIVISION

needed convincing. Streambank fencing agreements were negotiated, and caveats were registered on the properties to bind subsequent owners. Enlisting the support of landowners proved difficult in some cases, so where possible the Crown purchased lands along the river. As of 1991, the program has spent \$228,600 working on the river, and \$552,300 on 427 hectares of prime riverside habitat. Fences now protect all but about nine kilometres of the total stream length.

In addition to the practical challenges, two features of the program pose esthetic or even ethical problems.

First, humans introduced trout to the river. The North Raven's brook trout are native to eastern North America, and its brown trout are an Old World species. Why work to restore trout habitat in a river with no naturally occurring trout? For Barry Mitchell, this is a quibble. "These fish are wild trout," he says.

"They live and spawn there. It hasn't been stocked since the thirties."

Second, restoring the river has required beaver control. "On a spring-fed stream like this," says Rocky Konynenbelt, a habitat projects technician with the Rocky Mountain House Fish and Wildlife office, "beaver ponds act as settling basins for silt and affect the stream a fair distance upstream." Is it right to trap out a native animal that has its own plans for the river? "As soon as man gets involved, you've altered things," says Konynenbelt. Humans first reduced populations of beaver, then reduced the populations of their predators, and then almost stopped trapping beavers altogether, allowing their population to explode. With natural population regulators out of whack, Konynenbelt believes it makes sense to control the number of beavers on the North Raven.

The fact that the program decided both of these issues in favor of the trout makes the motive behind the North Raven's comeback as clear as its water. "It is mostly a fisheries objective," admits Konynenbelt. Still, what is good for the trout seems to be very good for the river. Konynenbelt puts it simply: "It would be slightly different in its natural state... Man came in and significantly altered the landscape. Now we've isolated the stream from agriculture and allowed the stream to come back."

After

In a section of the river fenced for 10 years, trout numbers have increased by 223 per cent. Over the same period, in an unfenced stretch, trout numbers have fallen 47 per cent below already low levels.

But the program's real success cannot be described with numbers. Barry Mitchell does it with words:

"I'll have a hell of a day... I'll grab a fishing rod and a pair of waders and drive up there at the next thing to the speed of light, and by the time I hike out to the centre of the creek I've stopped grinding my teeth. I don't have a business, I don't have an accountant, it's just me in the creek, feeling the rush of water on my waders, seeing the trout on the rise, seeing a mink on the bank, or an osprey overhead."

Lynn Zwicky

LETTERS

Don't Forget Our Roots

Dear *Environment Views*,

The articles in the Spring 1991 issue of *Environment Views* would have led the reader to conclude that the public participation process in Alberta is a new phenomenon. Unfortunately, this is a perception that is grossly incorrect. Those of us who have been involved in environmental issues for over 20 years know that the golden era of public participation occurred in Alberta between 1971 and 1976. The Environment Conservation Authority, which was created in 1969, held public hearings on a variety of subjects ranging from technical subjects such as sulphur emissions from gas processing plants, the development of a strategy for the management of the Eastern Slopes of the Rockies and flow regulation on the Red Deer River.

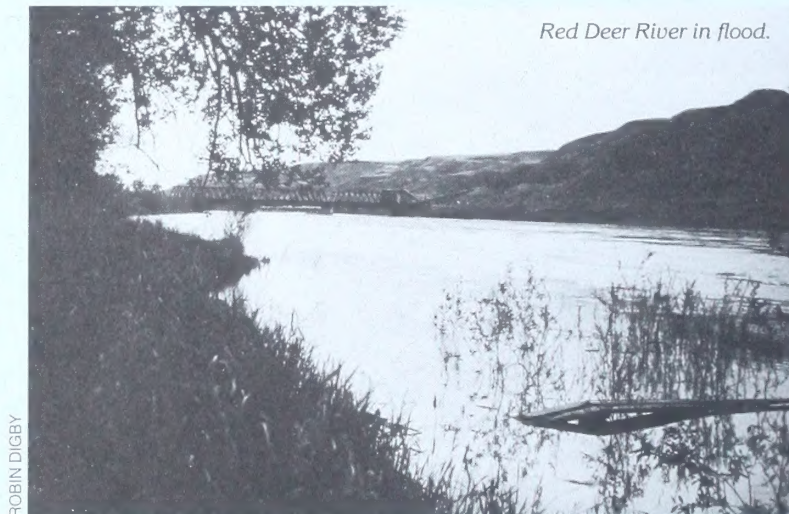
The hearing process developed by the Environment Conservation Authority was exemplary. Its research officers carefully prepared information documents for each public hearing, which assembled a comprehensive database. This enabled the public to provide an informed response as well as to extend or correct this database. The most impressive aspect of the hearings held by the authority was their organized informality. Many school teachers used those hearings as an educational process for their pupils. Consequently, the age of participants ranged almost from cradle to grave. The chairman of the Authority, Dr. Walter Trost, and such

distinguished board members as Julian Kinisky were marvellous at making everyone feel comfortable at these hearings. They exerted great patience and encouraged everyone to participate. The hearings in rural Alberta became special social events for everyone that attended. Local groups organized lunches and dinners. This was the era of true public participation. The reports summarizing the hearings as well as the recommendations made by the

Minister of the Environment. To its credit the Council did try to hold effective hearings within a new structure as those on forestry and the Oldman River dam attest, but limited budgets precluded the development of pre-hearing material of a comparable quality. Industry environment professionals changed the nature of the hearing process making the average citizen feel uncomfortable and inadequate to participate. The hearing process became

mandate so effectively that the succeeding government, marching to another agenda, felt so threatened by 3 E public participation that it felt compelled to destroy the Environment Conservation Authority. Today, we have a long way to climb before we regain the Olympian heights that we once attained in Alberta 3 E public hearings. Yours sincerely,

H.A. Buckmaster
Professor of Physics
University of Calgary



Authority were models of clarity and pioneered the use of cost-effective minimal impact analysis.

Unfortunately, the Environment Conservation Authority was dismantled by the Alberta government headed by Premier Lougheed because it had carried out its mandate too successfully and effectively. The recommendations on the regulation of flow on the Red Deer River so outraged the government and ran counter to the dam-building philosophy of the Department of the Environment that the Environment Conservation Authority, a Crown organization, was disbanded and replaced by the Environment Council of Alberta which reports to the

professionalized and the public felt excluded.

It is evident from the comments in the Spring '91 issue on public participation that Albertans lost something special when their government decided in 1976 to destroy the Environment Conservation Authority because it had become world-famous for pioneering public hearings that were effective, equitable and educational. The 3 Es of public hearings are more important today than ever before because of public awareness and concern about environment issues.

Albertans deserve to know that one of their governments had the courage to create an environmental watchdog that learned to carry out its

Buffalo Response

Dear Editor:

The Summer 1991 issue of *Environment Views* contained a correction stating that Wood Buffalo National Park bison were contaminated with disease introduced by bison imported from the U.S. and moved from Wainwright to WBNP during World War II.

I have a further correction. The Wainwright bison were shipped to WBNP in the 1920s, beginning in 1923, not during World War II. If you wish additional information on this process, I would be pleased to supply it.

Also, while the core of the Wainwright herd was the Pablo herd from the U.S., I believe that bison from other areas were added from time to time.

There is, of course, no hard evidence that tells us that tuberculosis and brucellosis were not already among the northern herds when the Wainwright bison were introduced to the park. And, it is possible that disease would eventually have been transmitted to the northern bison from domestic stock kept at trading posts and missions in the vicinity of the park. Anthrax,

for example, occurred without an identifiable cause among park bison after World War II; birds may have been the vector. Nevertheless, it is reasonable to point to the Wainwright bison as the source of TB and brucellosis among WBNP bison, since it is known that these diseases (or at least TB) did exist among the animals at Wainwright.

Sincerely,

Patricia A. McCormack, PhD
Curator of Ethnology
Provincial Museum of Alberta

Arts Issue "Best Ever"

Dear Editor:

Your recent Winter 1992 *Environment Views* about the environment and the arts was the best issue ever! So many people who love nature can't communicate their feelings of spiritual connectedness in any other way than through art.

The natives of any culture just naturally wrote songs and painted pictures about Mother Earth. Nice going!

Sincerely,

Debby Gregorash
Coaldale Ecology Club

Compromise Is an Illusion

Dear Editor:

I found parts of the article "Forest Industry in Alberta: An International Issue?" (Fall 1991) naive to the point of non-journalism. Perhaps your magazine feels the need to be optimistic or to appear unbiased?

To assume that there can be any compromise between the public and its elected representatives after the contempt

the government has exhibited over the Mitsubishi megamill is, I reiterate, naive. To view the issue as anything but a cynical prostitution of the democratic process is to be a part of it.

A brief examination of the history of the AlPac saga clearly indicates that the Alberta government never for a second considered that it might be untenable. It has alienated Dr. David Schindler (winner of the Stockholm



water prize), the AMA, the ATA, native groups, environmental groups, all opposition parties and spent copious quantities of taxpayers' money doing it.

The first review panel made many recommendations, the most pertinent of which suggested that no more mills should be constructed until adequate baseline studies were carried out. Both levels of government conceded to the river system studies, but AlPac went ahead. The feds became culpably mute.

Compromise, by definition, means that both sides move toward a more common centre, yet environmentalists are expected to move, while government stays put.

What appears to be happening nationwide is that the preferred route for government seems to be litigation. By tying up the issue in court battles and meanwhile constructing, the proponents find themselves in a winning situation. They lose the case but they have the project and the whole issue is a fait accompli.

Dr. Dancik seems to imply that the forestry issue is insignificant for Alberta.

Consider this: the AlPac FMA is 61,000 square kilometres and they intend to log "only" one per cent of this, which is 610 square kilometres. This is an area of land equivalent to a one-kilometre swath from here to beyond Saskatoon, Saskatchewan. How much wildlife habitat does that constitute?

When I first became involved in environmental issues I might have concurred that enough letters, protests, workshops and academic reports would sway the political agenda. I now know this to be a pipe dream, at least in Alberta. My feelings are reinforced by consideration of the economics of the issue.

Pulp prices are at an all-time low and there is a glut on the market. Daishowa wishes to divest itself of its not yet one-year-old mill. California has enacted legislation requiring 40 per cent recycled fibre and both Congress and the Senate are looking at similar legislation nationally. Prominent persons in the paper industry are saying this situation will prevail for the next decade. Is this the time to

be putting \$75 million in roads and \$400 million in loan guarantees into a pulp mill?

Building megaprojects is a wonderful way to create jobs but is it fair to leave our children with the legacy of these liabilities? They will pay the price in coin and ecological destruction and it bothers me greatly.

Yours very sincerely,

David Parker
Northern Alberta Institute of
Technology
Edmonton

Are you a new reader?

Environment Views will be distributed free at all Environment Week activities throughout the province. If you picked this copy up at one of the locations, or are reading a friend's, welcome.

Environment Views covers topics of environmental concern to Albertans, providing facts and a forum for a range of views. If you're interested in Alberta's environment, send in the card and become a subscriber. It's free. If the card is missing, phone or write to us at the address inside the front cover.

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ENVIRONMENT UPDATE

Boreal Forest Course

The University of Saskatchewan's Extension Division is offering a field course for professionals on the ecosystem dynamics of the boreal forest. The course, **Encounters With Saskatchewan's Endangered Spaces**, is a 9-day field course to be held June 20-29 at Besnard Lakes, 80 km northwest of LaRonge. Ten instructors, using hands-on investigative approaches, will help participants develop a broad understanding and appreciation of the immense diversity and complexity of boreal forest ecosystems.

The cost is \$565. For further information, contact Peter Jonker, program coordinator, Environment, Science and Technology, 306-966-5552, fax 306-966-5567.

Landscape Ecology Workshop

June 17-19, Edmonton
The Canadian Society for Landscape Ecology and Management is holding a national workshop on **Sustainable Landscapes**, featuring 28 speakers from across Canada.

Contact: John Marczyk or Doug Kostashuk, Alberta-NWT CSLEM Network, c/o Resource Planning Branch, Alberta Forestry, Lands and

Wildlife, 8th Floor, 9942 - 108 St., Edmonton T5K 2J5, 427-3608 or fax 422-9684.

Curtain Call for Precipice

Banff-based Precipice Theatre has a big season planned. In July, it will be filling Banff's Central Park Gazebo with such characters as Ms. Plastic, Mr. and Mrs. Paper and Mr. Toxic Waste, all competing for the Trash Crown of 1992, in **Trash Pageant**.

A different stage will be used for **Watershed of Tears**, Precipice's newest production. The show will feature several swimming characters. The result of Precipice's work with the Alberta Environmental Network Water Caucus, Watershed will be staged at poolside, beginning with a short Environment Week tour of the pools of central and southern Alberta. For bookings or further information, contact Precipice Theatre, Box 1942, Banff T0L 0C0, 762-8113.

Environmental Law

Lawyers are offered the course **Environmental Law**:

an intensive short course for practitioners by the Canadian Institute of Resources Law. It will be held at the law school of the University of Calgary June 8-12. The course is intended for both lawyers wanting to know how environmental considerations affect most aspects of their practice, and for those wanting to develop an environmental practice. For further information, contact Nancy Money, administrator, Canadian Institute of Resources Law, Faculty of Law, U of C, Calgary T2N 1N4, 220-3200, fax 282-6182.

Jasper this Summer

The Jasper Institute is again offering a series of natural history courses in the park this summer. Most courses are held over weekends from July 17-August 16, and are based in the Palisades Environmental Sciences Centre outside the townsite. Subjects range from wild flowers and birding to geology and deep ecology. For a brochure and further information, contact the Jasper Institute, Box 2337, Jasper T0E 1E0, 852-4012.

Hot Conferences

Second International Symposium on Agricultural Techniques in Cold Regions
Aug. 4-7, Edmonton.

Range of topics on limitations of cold climates on soil, plant and animal productivity.

Contact: D.S. Chanasyk, Dept. Soil Science, Rm. 4-42 Earth Sciences Bldg. U of A, Edmonton T6G 2E3, 492-3242 or fax 492-1767

Environmental Soil Science
Aug. 8-15, Edmonton.

In conjunction with the Agricultural Techniques in Cold Climates symposium. Organized by the Canadian Society of Soil Science, Canadian Land Reclamation Association, International Society of Soil Science.

Contact: CSSS/CLRA Conference, Dr. P.M. Huang, Dept. Soil Science, University of Saskatchewan, Saskatoon, Sask. S7N 0W0, (306) 966-6838, fax (306) 966-6881

Second International Conference on Environmental Issues and Management of Waste in Energy and Mineral Production

Sept. 2-4, Calgary.

Major international conference on sustainable mineral and energy resources development, minimizing waste and pollution, environmental protection and compliance, current and emerging waste management practices, the role of computers and GIS and other topics.

Contact: Raj K. Singh, conference chairman, P.O. Box 68002, Ranchlands RPO 7750, Ranchview Dr. N.W., Calgary T3G 3N8, 239-3849, fax 241-9460.

If you have a short news item of provincewide interest you'd like to contribute to Environment Update, please send it to the editor at the address on the Contents page. The editor reserves the right to select and edit items.